Ferlin

plastics automation

IMPROVING PLASTICS TOGETHER

USE AND MAINTENANCE MANUAL FOR HONEY CUMB DEHUMIDIFIER

TYPES OF MACHINE

FED 100/150(HT)
FED 150/200(HT)
FED 150/400(HT)
FED 250/600(HT)
FED 250/800(HT)
FED 350/1000(HT)
FED 350/1500(HT)

PREMISE

This manual was drawn up with the intention of providing operators with the right information for proper use and maintenance of the machine. It is therefore essential to carefully read the manual, in its entirety, in order to prevent any inconvenience that could compromise proper operation or possibly cause irreparable damage to the machine. The use of these components is prohibited on all materials other than plastics in non-toxic granules (eg powdered plastics, explosive mixtures, flammable, harmful and food products).

Here are some general points which are recommended to be followed:

- *we recommend that you read this manual entirely before carrying out any maintenance operations and before using the machine for the first time.*
- *the machine is equipped with all the safety devices essential for checking operation and preventing possible accidents. However, these devices tend to prevent injury but not to exclude it. In no case, therefore, must dangerous manoeuvres be carried out without first making sure that the safety devices are in perfect working order and that you are operating in completely safe conditions.*
- *the machine must not be used for purposes other than those for which it was designed and built.*
- *this manual contains the technical characteristics and work performance provided by the machine. These services must not be changed.*
- *the performance and good operation of the machine are guaranteed if the connections to the electrical, pneumatic and water networks always comply with the power supply characteristics and the connection methodology reported in this booklet.*
- *the user must be perfectly familiar with the technical and operating characteristics of the machine. Any problems or faults generated by incorrect use and maintenance will invalidate the warranty conditions. The manufacturer is relieved of all responsibility even in the event that the units it produces are not used for the intended uses.*

INDEX

1 MANUFACTURER

Company name:	Ferlin Plastics Automation
Legal and administrative residence:	Rudolf Dieselstraat 15A 7442DR Nijverdal (NL)
Telephone:	+31 (0)548 745 370
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Chamber of Commerce registration number:	05034007
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Manufactured by:

Manufacturing company name:	*NEW OMAP s.r.l.*
Legal and administrative residence:	*Via A. Volta 1/C* *35020 LEGNARO (Padova) - ITALY*
Chamber of Commerce registration number:	*CCIAA PD 366924*
Tax code and VAT number:	*04158840282*

2 RISKS AND DANGERS

2.1 Symbols shown

Table 2.1 shows the risks for the operator together with the mandatory signs regarding the use of personal protective equipment to be worn when using the machine.

Table 2.1: risks to the user


GENERIC DANGER

DANGEROUS ELECTRICAL VOLTAGE

DANGER OF BURNS

SAFETY FOOTWEAR

PROTECTIVE GLOVES

PROTECTIVE VISOR

2.2 Warnings and danger warnings

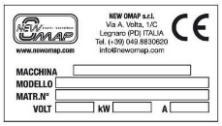
Filter cleaning
Filter cleaning must be performed with the machine stopped and after the blower has stopped.

Opening the side panel of the machine

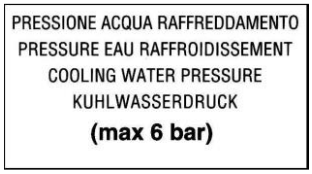
Operating with the side panel open is very risky. Therefore make sure that the electrical circuit is suitably sectioned.

Presence of multiple levels of tension
Pay the utmost attention even with the panel open in Section.

Presence of compressed air
Make sure that there are no leaks in the compressed air circuit which is essential for controlling the pneumatic valves/



Machine plate
Figure 2.5 shows the plate data indelibly so that they cannot be modified or eroded over time.



Cooling water pressure
Figure 2.6 indicates the presence of a cooling circuit which is not mandatory in the installations of MD type dehumidifiers.

Dew point control
Figure 2.7 indicates the presence of a probe for measuring the dew point of the air entering the hopper. In case of replacement, handle the probe with extreme caution.

2.3 Noisiness

The noise level is measured in free field at 1 m from the source and 1.5 m from the ground and is less than 80 dB or below the legal limits. Even if the limit threshold is not exceeded, it is still advisable for the operator to use hearing protection devices (earplugs, headphones).

2.4 User obligations

The operator is obliged to:

- prohibit non-workers from approaching the operating range of the machine in operation;
- do not remove the risk warnings provided;
- use protective gloves to avoid cuts and / or burns;
- use protective mask to avoid toxic inhalations;
- never rest your hands on the edges of the hopper when its lid is open;
- strictly dehumidify only non-toxic material;
- equip the system (if necessary) with a special extractor hood;
- never remove the safety devices installed on the machine;
- do not smoke near the dehumidifier;
- arrange fire prevention measures in the vicinity of the dehumidifier;
- carry out maintenance operations on the machine EXCLUSIVELY with the machine stopped and disconnected from the power supply (disconnecting switch on the machine board open);
- do not remove the filters from the machine in operation;
- do not use the machine outdoors (outdoors);
- if it is necessary to move the machine, move it only with the hopper empty.

2.5 Transport and unpacking

The means of loading, unloading and transport must comply with the regulations in force. The machine must be handled by lifting it from the bottom, inserting the tips of the lifting trolley (figure 2.8). It is recommended NOT to use ropes or chains to harness the packaging. Before lifting, check that nothing can fall during lifting operations.

During unpacking operations, the operator must use protective gloves and clothing to avoid possible cuts or grazes due to the presence of wooden parts and plastic bands. The machine is delivered inside a carton or on a wooden pallet. Inside there are:

- The dehumidification unit;
- The insulated hopper with the connection pipes;
- The connection base
- The trolley with the suction drawer
- The use and maintenance manual.

3 DESCRIPTION OF THE MACHINE AND OPERATING CYCLE

3.1 Description

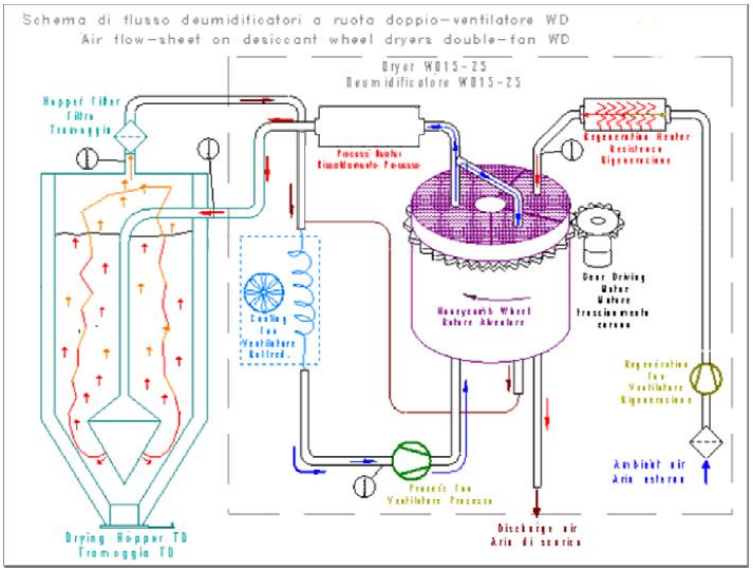
The DRCPS.0005 – DRCPS.0012 dehumidifiers have the function of removing moisture from the plastic material in non-toxic granules placed inside the connected hopper; within them they are made up of the following fundamental elements:

- dehumidification wheel;
- process and regeneration air blowers;
- heating resistors for the process and for regeneration;
- command and control panel.

3.2 Operation cycle

Figure 3.1 illustrates the work cycle as a whole; inside the alveolar cavity wheel 3 treatments are performed simultaneously:

1) the process that occupies half of the cavities and consists of introducing dehumidified air into the hopper. The blower circulates air within a closed circuit, which is dehumidified and subsequently brought to the desired temperature through the process resistance;



2) regeneration where part of the cavities release moisture to the heated ambient air with which it comes into contact;
3) the cooling necessary to prepare the wheel cavities to carry out the process step again.

The process is able to maintain low-variable dew point values over time thanks to the cyclicality provided by the movement of the wheel. The technical characteristics and the projections of the machine are grouped in table3.1.

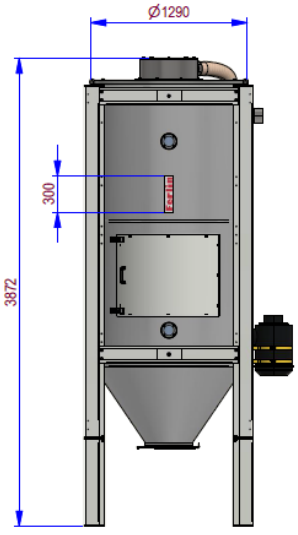
3.3 Other characteristics

Specifications	Unit	FED 50/100	FED 50/100HT	FED 100/150	FED 100/150HT
Process temperature	°C	70-150	70-170	70-150	70-170
Air flow	M3/h	50	50	100	100
Blower power	kW	0,85	0,85	0,85	1,5
Process heating	kW	4,5	4,5	4,5	4,5
Regeneration heating	kW	2,8	2,8	2,8	2,8
Total installed power	kW	8,0	8,0	8,0	8,0
Voltage	V	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz
Hopper volume	Dm3	100	100	150	150

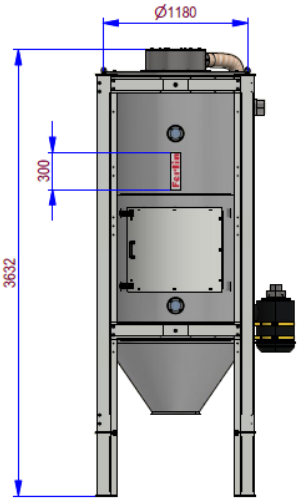
Specifications	Unit	FED 150/200	FED 150/200HT	FED 150/400	FED 150/400HT
Process temperature	°C	70-150	70-170	70-150	70-170
Air flow	M3/h	150	150	150	150
Blower power	kW	0,85	0,85	0,85	1,5
Process heating	kW	4,5	4,5	4,5	4,5
Regeneration heating	kW	2,8	2,8	2,8	2,8
Total installed power	kW	8,0	8,0	8,0	8,0
Voltage	V	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz
Hopper volume	Dm3	200	200	400	400

Specifications	Unit	FED 250/600	FED 250/600HT	FED 250/800	FED 250/800HT
Process temperature	°C	70-150	70-170	70-150	70-170
Air flow	M3/h	250	250	250	250
Blower power	kW	1,5	1,5	1,5	1,5
Process heating	kW	4,5	4,5	4,5	4,5
Regeneration heating	kW	2,8	2,8	2,8	2,8
Total installed power	kW	9,0	9,0	9,0	9,0
Voltage	V	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz
Hopper volume	Dm3	200	200	400	400

Specifications	Unit	FED 350/1000	FED 350/1000HT	FED 350/1500	FED 350/1500HT
Process temperature	°C	70-150	70-170	70-150	70-170
Air flow	M3/h	350	350	350	350
Blower power	kW	3,0	3,0	3,0	3,0
Process heating	kW	7,5	7,5	7,5	7,5
Regeneration heating	kW	2,8	2,8	2,8	2,8
Total installed power	kW	13,0	13,0	13,0	13,0
Voltage	V	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz	400V 3+N 50Hz
Hopper volume	Dm3	200	200	400	400



FED 350/1500(HT)



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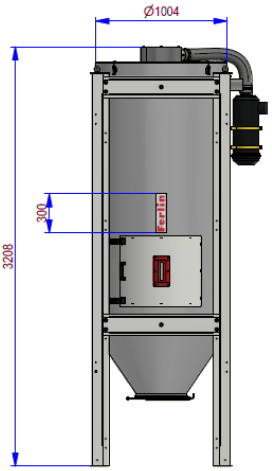

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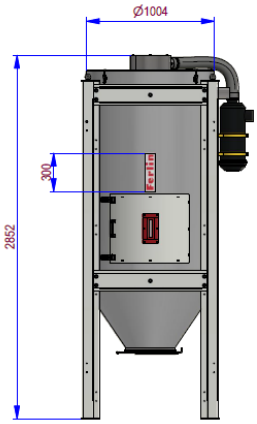
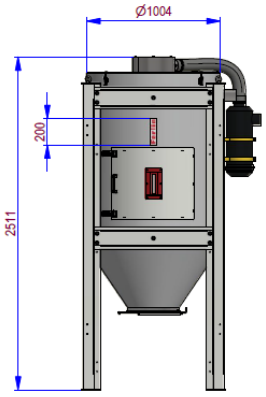


FED 250/600 (HT)



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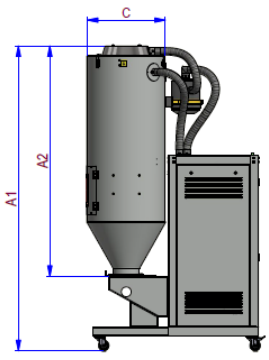


FED 150/200(HT), FED 100/150(HT), FED 50/100(HT)

	Unit	FED50/100	FED 100/150	FED 150/200
A1	Mm	1750	1800	2100
A2	Mm	975	1275	1580
C	Mm	550	550	550

4 INSTALLATION

The machine must be installed by expert personnel and in full compliance with all applicable regulations. The installation interventions must be carried out in conditions of absolute safety both for those who carry out the work and for those in the vicinity. To achieve this, the workers must be equipped with all the necessary devices, which delimit the work area with signaling tapes and have danger signs at strategic points. The machine has been designed to be able to work with the following limit values:

- Room temperature +5°C +40°C
- Storage temperature -10°C +50°C
- Relative humidity without condensation 30% 95%
- Maximum altitude 2000 m s.l.m.

4.1 Electrical connection

The electrical connection must be carried out by expert personnel. Check the machine plate data and verify that the line is suitable for the power of the machine. Prepare an adequate protection and sectioning system upstream of the machine as well as connect an efficient earth system.

The machine must be connected using the cable on the machine. If it is necessary to replace it, the new cable must have the same characteristics. Also check that the voltage and frequency of the power supply line correspond to those indicated on the plate of the dehumidifier. Having checked everything, power up the machine. The machine can be powered in 2 ways:

- via PLUG-SOCKET: The assembly of the device running with power supply from an electrical socket requires the installation on the power cable of a plug compliant with current legislation, in the country of use;
- from FIXED SYSTEM: The power cable must be connected to the fixed system by means of a protection device against short circuits and earth faults. It is assumed that the maximum short-circuit current allowed in the machine switchboard is equal to 10 kA.

4.2 Hopper connection

For these sizes of dehumidifiers, the hopper is always connected via pipes fixed at the end by metal clamps since and encumbrance of the 2 organs do not allow direct connection.

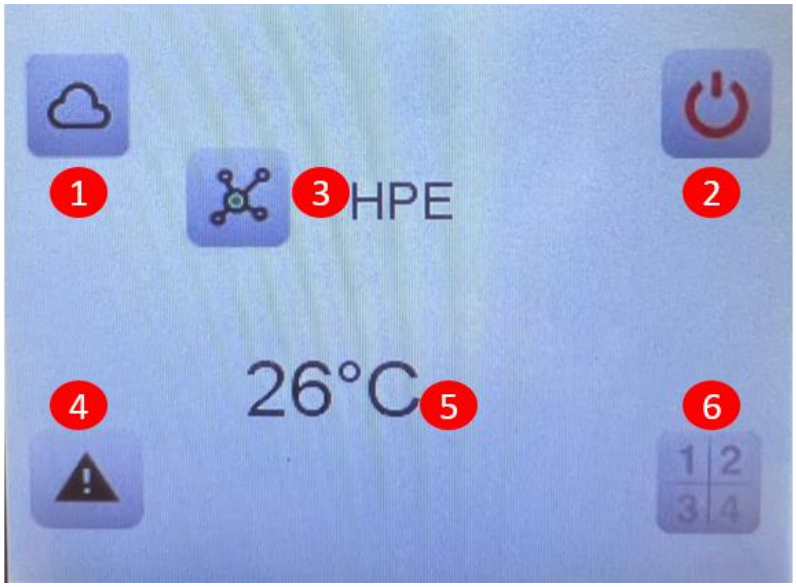
4.3 Cooling water connection (ONLY FOR HT MODELS).

The couplings for the cooling water connection have a diameter of 1/4 inch.
The pressure must not be greater than 3 bar. The cooling water temperature must be below or equal to 18 ° C.

5 HUMAN MACHINE INTERFACE

The dehumidifier is equipped with a graphic (TOUCH SCREEN) for managing the machine status and any alarms.

When the machine is turned on, after a few seconds, the display shows the screen in which describes the status of the machine, the type of material and the actual operating temperature.



1) FerlinBridge
2) State of operation
3) Material recipes
4) Alarm
5) Current temperature

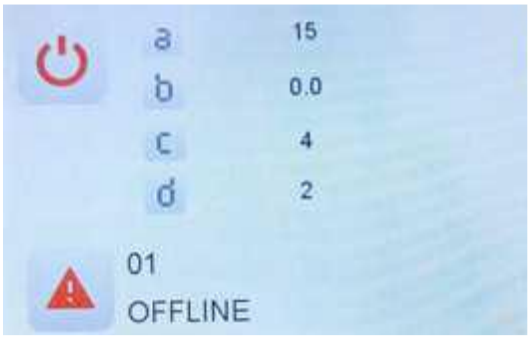
6) Main pages

Operating status:

1) if the machine status is in start pressing this button once changes the status to ventilation after about 10 minutes (cooling time) the machine stops and the status is changed to stop

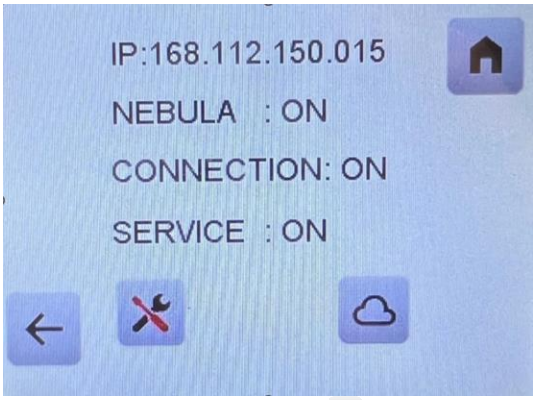
- START
- STOP
- VENTILATION

2) **Receiver**: If the machine has the receiver (Hopper Loader) MOVAC Easy-4 or MOVAC Easy-5 physically connected, press the icon the figure 5.3 is shown. Through the icon turns on or off and it is possible to change the parameters of the a & b & c & d receiver.



OFFLINE: it means that the receiver is not connected.

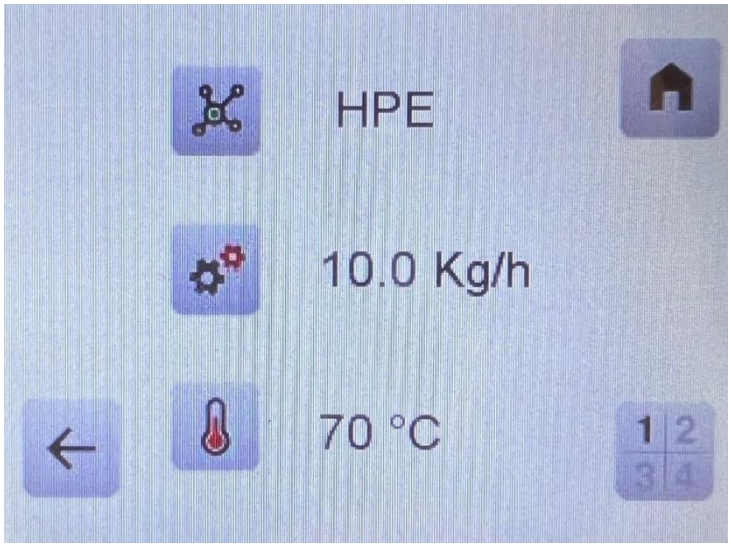
3) **Manage FerlinBridge**: To check the FerlinBridge status and change the activation, press the icon. On this page, the user can set the IP of the machine, the status of NEBULA, the internet connection and the service status for remote maintenance. Pressing the icon with the Password 8 8 8 8 you set the status of NEBULA and SERVICE.



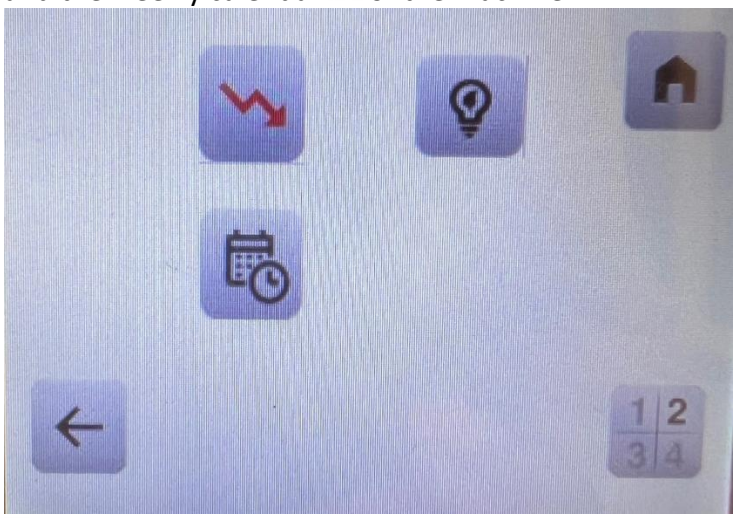
4) **Alarm**: Pressing the icon (reset the alarm), which specifies the number, date and time of the alarm.

5) **Main pages**: The Touch screen contains 4 main pages pressing the icon shows the first page.

I. On this page the user can change the type of material (the recipe) by pressing once on the material icon. Up and down arrows for choice of recipe (material). When the user confirms a recipe, the material treatment temperature and the flow rate in kg / h for the material are automatically written, which will vary according to the size of the hopper and the model of the dehumidifier. The user can change the flow rate and temperature according to his needs pressing the icon can change the temperature and on the icon.

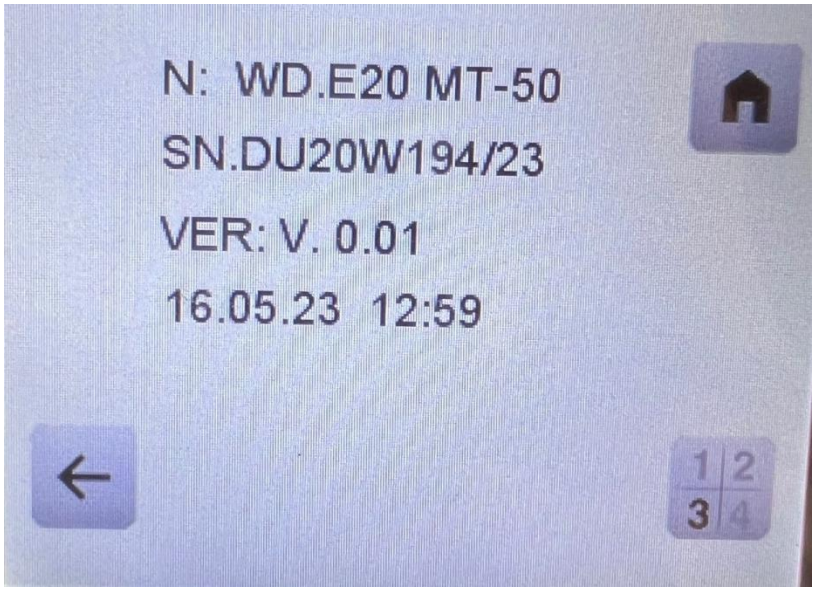


II. From the second page, the user can activate or deactivate the RCE (anti-stress) function , the energy function for energy saving of the machine and the weekly calendar of the machine.



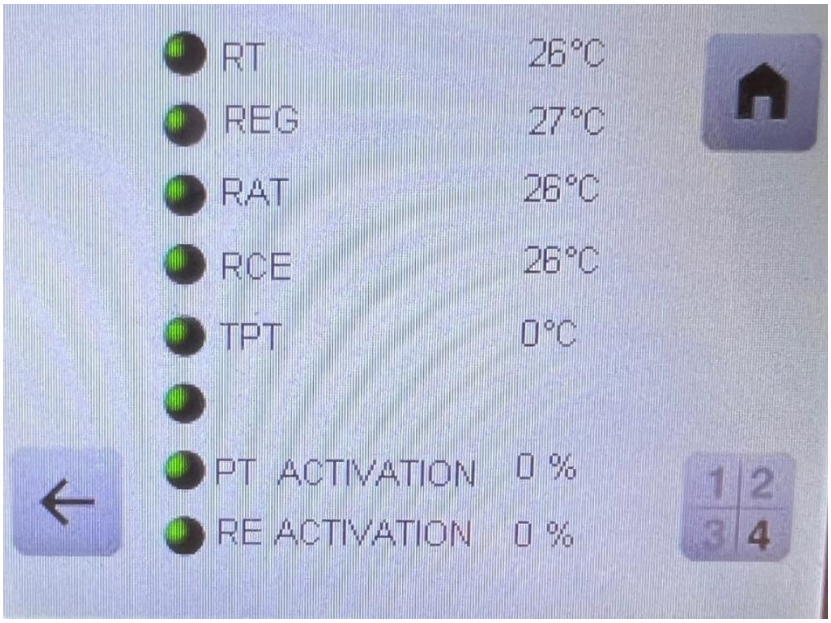
- RCE deactivated
- RCE activated
- Weekly calendar active
- Weekly calendar disabled
- Energy saving (0)
- Energy saving (1)
- Energy saving (2)

III. The third page contains the machine data; Model, serial number, software version and date and time.

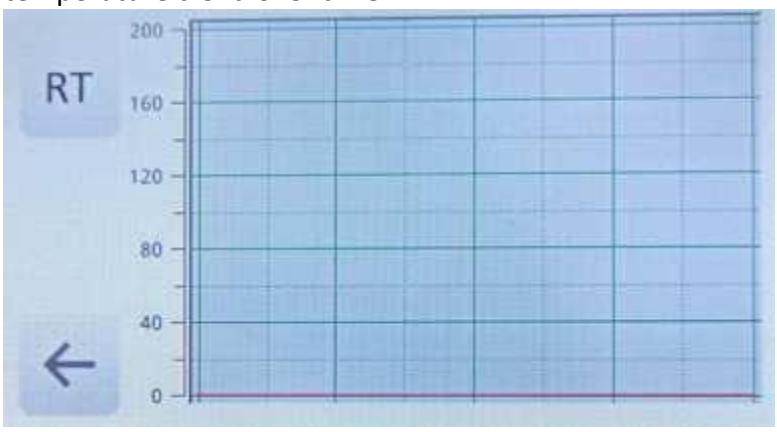


IV. The fourth page shows all temperatures of the machines.

- RT : the actual operating temperature.
- REG: the regeneration temperature.
- RAT: return air temperature.
- RCE: the RCE temperature (hopper area return)
- TPT: regeneration exhaust air temperature (to manage the energy function)
- PT ACTIVATION %: the percentage of activation of the process resistor.
- RE ACTIVATION%: the percentage of activation of the regeneration resistor.



Pressing each icon on the screen shows the graph that describes the temperature trend over time.



5.1 Safety thermoregulator

The thermoregulator display shows two temperature values: the larger green one represents the temperature detected by the instrument while the smaller red one represents the set for which there is an alarm. To change the alarm set, simply press the "_" button to increase and "_" to decrease the alarm temperature value. When the alarm value is reached, the heating of the machine stops as the automatic stop of the dehumidifier is implemented. The set alarm set must be 25 ° C higher than the process set in the electronic control board of the machine to avoid untimely trips due to temporary temperature peaks inside the process tower that may occur during normal operation.

6 OPERATIONAL PROBLEMS AND POSSIBLE REMEDIES

Before asking e-service, verify the possible remedies in the following table.

Problem	Remedy
Alarm 01 **proces over temperature**	Clean hopper filter. Check process blower and pipes conditions as well as process temp. selection
Alarm 02 **regeneration over temperature**	Clean regeneration filter. Check regeneration blower and pipe conditions. Check if SSRR, FU2 works properly
Alarm 03 **Safety thermoregulator**	Check if the difference between probe process temp. and thermoregulator probe alarm temp. is at least 25°C
Alarm 04 **Contactor**	Check if KM works properly or check the phases sequency
Alarm 05 **Motor ciruit breaker INVERTER**	1) Check possible clogged filter 2) Check inverter 3) Check power supply presence
Alarm 08 **Return air temperature**	1) Turn RCE function on 2) Check air return cooling system
Alarm 09 **Process heating missing**	Check KM FU2 SSRP HEP
Alarm 10 **Regeneration heating missing**	Check KM FU3 SSRR HER
Alarm 12 **Clogged filter**	Replace the black filter with a new one
Alarm 13 **Process probe damaged**	Replace probe ST1
Alarm 14 **Regeneration probe damaged**	Replace probe ST2
Alarm 16 **Return air probe damaged**	Replace probe ST3
Alarm 18 **R.C.E. probe damaged**	Replace probe ST4
Alarm 19 **Dew point probe damaged**	Replace probe D.P.
Alarm 20 **Dew Point alarm (dew point temp.higher than the set)**	Automatically disappears when the dew point set is reached. If it does not disappear, check the rotor functioning
Alarm 22 **Cartridge movement micro switch**	Check FU4, M2 and the microswitch
Alarm 23 **Panel safety micro switch**	Check side panel closure
Alarm 27 **T1 process thermal switch**	1) Check SSRP 2) Check for clogging of filter and pipes thermal swith T1
Alarm 28 **T2 regeneration thermal switch.**	1) Check SSRR 2) Check for clogging of filter and pipes thermal switch T2
Alarm 29 **phase sequence**	Check sequence / lack of phases
Alarm 44 **Switch off not properly executed**	Press STOP. Next time let the ventilation after switch off fan run for the time due (~20 minutes)

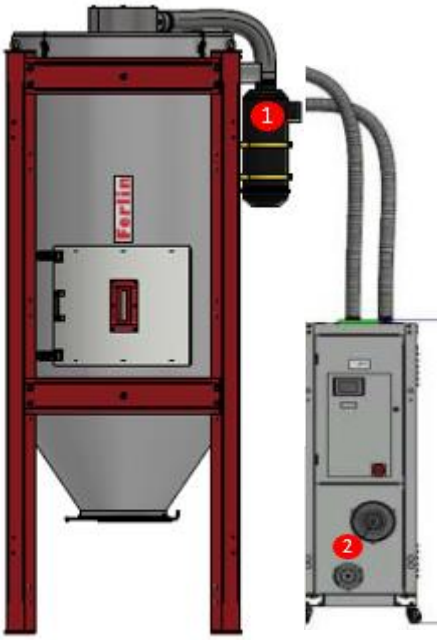
7 MAINTENANCE

Machine maintenance must be carried out by expert personnel and in full compliance with all applicable regulations. Maintenance interventions must be carried out in conditions of absolute safety both for those who perform the work and for those in the vicinity. To achieve this, the workers must be equipped with all the devices necessary to operate safely, which delimit the work area with signaling tapes and have danger signs in the points at risk. Carry out maintenance operations with the machine off.

7.1 Ordinary

The routine maintenance program is established taking into account the optimal conditions of the machine, its way of working and the environment in which it normally operates. It is therefore essential to establish and follow a regular inspection and maintenance program. Ferlin Plastics Automation declines any responsibility for damage to persons and / or things deriving from non-compliance with the aforementioned standards or from irregular and / or improper use of the machine.

The dehumidifier as well as the dehumidification hopper are equipped with an easy-to-remove black cartridge filter (1) to prevent the dust of the dehumidified material from coming into contact with the heating elements or with the inside of the blower.
There is also a paper filter for the regeneration process (2). These filters must never be removed with the appliance running. It is advisable to clean the dehumidifier-hopper filters on a daily basis, by switching off the machine and cleaning by means of a blowing process. Dirty and clogged filters reduce the performance of the machine. It is also necessary to carefully clean the hopper every time the material is changed, to prevent any deposits from mixing with the new type of plastic. It is therefore necessary to turn off the machine, unload the material and after opening the lid, remove the air duct and carefully clean the inside of the hopper.



8 MACHINE END OF LIFE (RECYCLE)

When the machine needs to be eliminated, it is necessary to uninstall it from the system and place it internally in the warehouse until it is disposed of in a suitable environment, taking care to apply a sign with the wording:

MACHINE NOT AVAILABLE. TO BE DISPOSED

Before disposing please always get in touch with Ferlin Plastics Automation. In many cases we can give a refund for a used machine. This also enables us to recycle the machine as much as possible.

WE BELIEVE IN A
BRIGHT AND SUSTAINABLE FUTURE
FOR PLASTICS

9 WARRANTY

Ferlin Plastics Automation (hereinafter referred to as the SELLER) guarantees the BUYER, but not its ASSIGNORS, the machinery produced under the SALE contract, for a period of 12 months from the invoice date. The guarantee is applied for the free repair or replacement of parts found to be unserviceable due to faults or defects in material, construction or workmanship, provided that these parts are delivered ex factory of the SELLER. The general terms and conditions of delivery formulated by Metaalunie are applicable. In the event of a contradiction between the general terms and conditions of delivery of the Metaalunie and this manual, the general terms and conditions of delivery shall apply

In addition to the repair and replacement referred to above, the SELLER does not have any obligation and the BUYER is in particular excluded from the right to demand the termination of the SALE contract or any compensation for damages. If the repairs and replacements must be made in the place where the machine is installed, the travel (round trip) and accommodation costs of the SELLER's technicians will be billed to the BUYER based on the specially published rates.

In the execution, the SELLER company uses materials, organs and mechanisms of type, state and quality deemed at its sole discretion, suitable for the machine to be built, even after receipt of the order and can make constituent changes to the machines, always at its sole discretion. , the appropriate improvements.

The SELLER company will not be responsible for defects deriving from materials or designs supplied by the BUYER. The SELLER will be responsible only for defects relating to the conditions of use provided for in the use and maintenance manual and if the machine is used correctly and not for defects due to causes that arise after delivery. The warranty does not extend to failures or breakages resulting from natural wear and tear, negligent maintenance, inexperience, neglect or misuse of the machine by the BUYER and ceases if payments are not made by the BUYER at the agreed deadlines or if the machine, or parts of it have been modified or repaired without the written authorization of the SELLER.

The warranty of the electrical and electronic parts supplied with the machine ends with its regular start-up. In any case, any legal action for defects, deficiencies in quality, lack of performance or of certain requirements for any other reason or claim must be brought to the BUYER under penalty of forfeiture, within 12 months from the invoice date and will be or will become unacceptable when the BUYER is in arrears in the payment, even of a single instalment. In the event of a dispute, Dutch law will be competent.